motion such that the end effector axis can be moved in a straight line which is not restricted to the radial direction. In contrast, Ueyama, et al. describes in the embodiment of FIGS. 12 - 14 a robotic arm having an end effector axis about which the end effector rotates on the distal most link of the arm. The end effector axis in Ueyama, et al. does not perform non-radial motion as alleged by the Examiner.

The robot arm structure according to the present invention including the end effector with yaw motion provides significant advantages over the prior art arms without yaw motion such as that described by Ueyama, et al. The advantages of the invention include the ability to orient substrate holding cassettes and other substrate processing machinery in non-radial orientations and still access these cassettes and workstations with the robot arm with yaw motion. The robot arm also provides the ability to avoid obstacles in the process area, provides more flexibility in the design and planning of the wafer processing machinery, and reduces the space needed for processing. The robot according to the present invention allows the handling of substrates between workstations and cassettes which are arranged in a line without requiring translation of the robot with a track system. The yaw axis of the end effector also makes it possible to plan and execute continuous plan trajectories between two or more cassettes or workstations which results in smoother and faster substrate handling improving the overall performance of the system. These significant advantages are not taught or suggested by the prior art, either alone or in combination.

New Claims 51 - 58 have been added to further define the robotic arm structure of the present invention. New Claims 51 and 53 each recite a robotic arm structure including an end effector and a motor connected to rotate the end effector about the end effector axis to provide a yaw motion. The motor provides yaw motion of the end effector independent of a motion of the at least two links. The yaw motion provided by the motor connected to the end effector according to the present invention provides increased speed of processing and increased versatility in the arrangement of substrate cassettes and workstations. As

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described in Ueyama, et al. and shown in FIG. 12 of Ueyama, et al., a single motor 133 is used to control the motion of the robot arm and the end effector. There is no separate motor for control of the motion of the end effector independent of the robot arm. Accordingly, Claims 51 - 58 are also allowable.

Reconsideration and allowance of the above-identified application are respectfully requested. In the event that there are any questions concerning this Amendment, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution may be expedited.

Respectfully submitted,
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